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PATENT APPLICATION 3-7-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Mark H. SHIPTON et al.

Group Art Unit: 1742

Application No.: 09/987,683

WILLIAMS

Filed: November 15, 2001

Docket No.: 111129

For: NICKEL ALLOY COMPOSITION

CLAIM FOR PRIORITY

Director of the U.S. Patent and Trademark Office  
Washington, D.C. 20231

Sir:

The benefit of the filing date of the following prior foreign application filed in the following foreign country is hereby requested for the above-identified patent application and the priority provided in 35 U.S.C. §119 is hereby claimed:

British Patent Application No. 0028215.2 filed November 18, 2000.

In support of this claim, a certified copy of said original foreign application:

  X   is filed herewith.

           was filed on            in Parent Application No.            filed           .

           will be filed at a later date.

It is requested that the file of this application be marked to indicate that the requirements of 35 U.S.C. §119 have been fulfilled and that the Patent and Trademark Office kindly acknowledge receipt of this document.

Respectfully submitted,

James A. Oliff

Registration No. 27,075

Thomas J. Pardini

Registration No. 30,411

JAO:TJP/cmm

Date: January 23, 2002

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INVESTOR IN PEOPLE



The Patent Office  
Concept House  
Cardiff Road  
Newport  
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NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed

*Stephen Hordley*

Dated

22 November 2001

**OLIFF & BERRIDGE, PLC**

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APPLICANT: Mark H. SHIPTON et al.

APPLICATION NO.: 09/987,683

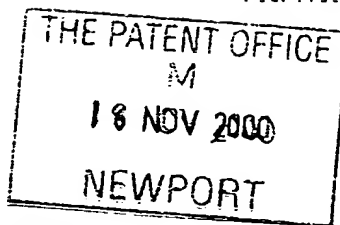
FILED: November 15, 2001

FOR: NICKEL ALLOY COMPOSITION

ATTORNEY DOCKET NO.: 111129

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference PAT/VJB/2836

2. Patent application number

(The Patent Office will fill in this part)

18 NOV 2000

0028215.2

3. Full name, address and postcode of the or of each applicant (underline all surnames)

ROLLS-ROYCE plc  
65 BUCKINGHAM GATE  
LONDON  
SW1E 6AT  
GREAT BRITAIN

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

GREAT BRITAIN

3770002

4. Title of the invention

NICKEL ALLOY COMPOSITION

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MR V J BIRD  
INTELLECTUAL PROPERTY DEPT EW 1-5  
ROLLS-ROYCE plc  
PO BOX  
FILTON  
BRISTOL BS34 7QE

Patents ADP number (if you know it)

6577903

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

# Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	0
Description	2 ✓
Claim(s)	1 ✓
Abstract	0
Drawing(s)	0

10. If you are also filing any of the following, state how many against each item.

Priority documents	0
Translations of priority documents	0
Statement of inventorship and right to grant of a patent (Patents Form 7/77)	YES ✓
Request for preliminary examination and search (Patents Form 9/77)	YES ✓
Request for substantive examination (Patents Form 10/77)	NO
Any other documents (please specify)	NO

11. I/We request the grant of a patent on the basis of this application.

Signature  
(MR V J BIRD)

Date  
16 NOVEMBER 2000

12. Name and daytime telephone number of person to contact in the United Kingdom MR V J BIRD 0117 979 7137

## Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

## Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

### NICKEL ALLOY COMPOSITION

The invention concerns a nickel alloy composition.

In particular, the invention concerns a nickel alloy composition for application to the tips of gas turbine blades to act as an oxidation and corrosion resistant barrier.

According to one aspect of the invention a nickel alloy has the following composition:

Element	Nominal Composition wt %
Co	4
Cr	4.5
W	2
Ta	6
Re	4
Al	6
C	0.05
B	0.005
Hf	0.15
Si	0.1
La	0.003 - 0.005
Y	0.003 - 0.005
Ni	Remainder

A layer of nickel alloy having a composition substantially as referred to above may be applied to the radially outermost tip of a gas turbine blade. Such a layer is effective as a barrier to prevent oxidation of the hot nickel alloy and also to prevent corrosion damage in general. The layer is preferably applied by means of a laser cladding process or by weld deposition.

In a laser drilling process a laser beam is directed at a selected surface or surface region of a nickel alloy component and a finely divided powder having a composition of the subject nickel alloy is fed directly into the laser beam impingement zone. The

beam energy density is sufficient to melt the nickel alloy powder causing the powder particles to fuse to the surface of the component and to each other, thereby to form a homogeneous layer of relatively high density. Effectively the particles of nickel powder are sintered.

Alternatively, the nickel alloy of the intended barrier layer may be prepared in rod or wire form and fed into the plume or arc of a welding torch onto a blade tip surface. As before the powder particles are fused together and to the blade surface to form the required barrier layer.

The deposited nickel alloy layer provides a high integrity treatment for the tips of shroudless turbine blades in a gas turbine, in particular a gas turbine propulsion engine.

Furthermore the tip layer exhibits a useful level of rub tolerance and so may be used where a tip may be expected to occur from time to time. The alloy may also be used to repair cast turbine components such as turbine blades, turbine shroud segments and nozzle guide vanes.

CLAIMS

- 1 A nickel alloy having the following composition:

Element	Nominal Composition wt %
Co	4
Cr	4.5
W	2
Ta	6
Re	4
Al	6
C	0.05
B	0.005
Hf	0.15
Si	0.1
La	0.003 - 0.005
Y	0.003 - 0.005
Ni	Remainder

- 2 A nickel alloy as claimed in claim 1 in the form of a layer applied to the tip of a gas turbine blade.
- 3 A nickel alloy as claimed in claim 2 wherein the layer is applied to the tip of a gas turbine blade by a laser cladding process.
- 4 A nickel alloy as claimed in claim 2 wherein the layer is applied to the tip of a gas turbine blade by a weld deposition process.
- 5 A nickel alloy substantially as hereinbefore described with reference to the disclosed composition.
- 6 A gas turbine blade having a tip layer comprising nickel alloy as claimed in claim 5.

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